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ABSTRACT:

PURPOSE: To improve detection limit and sensitivity and to enable detection of both positive and negative ions with the same gain by disposing a meshed electrode between an ion-electron converter and scintillator and forming a curved shape to focus secondary electrons to a scintillator surface by using the surface of the meshed electrode and the surface of the scintillator.

detect positive & negative ions, meshed electrode, focus electron

CONSTITUTION: The surfaces of the meshed electrode 2 and the scintillator 4 are shaped to the spherical surface having the same center so as to focus the secondary electrons generated by the ion-electron converter 1 onto an aluminum film 3. Ions 9 past a mass spectrometer 8 are converted to the secondary electrons 7 by the ion-electron converter 1 and are passed through the meshed electrode 2; thereafter, the ions arrive at the scintillator 4, by which the ions are converted to light. The light is amplified by a photomultiplier 5 and is detected. The value which is nearly 100% is obtainable for the count efficiency of the ions to be detected in the case of using a pulse counting system to count the number of pulses by converting the output of the photomultiplier 5 to voltage pulses. The

focus secondary electrons

detection limit of the detector is
thereby improved to a greater extent.

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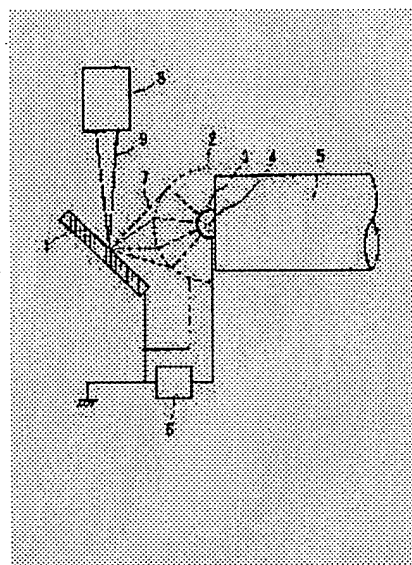
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(54) ION DETECTOR

(57)Abstract:

PURPOSE: To improve detection limit and sensitivity and to enable detection of both positive and negative ions with the same gain by disposing a meshed electrode between an ion-electron converter and scintillator and forming a curved shape to focus secondary electrons to a scintillator surface by using the surface of the meshed electrode and the surface of the scintillator.

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特開昭63-71680(3)

検出することができる。

本実施例によれば、イオン-電子変換器から発生した二次電子を採集して、効率よく利用できるため、特にカトンカウンティング用に低雑音とすべく光入射窓を小さくした光電子増倍管に対して、効率よく信号を増大することができる。パルス計数方式を使用した場合、100%に近い高い計数効率が得られ、雑音は毎秒1個以下と小さくすることができる。検出器の検出限界を大幅に向上させることができる。したがって、二次イオン強度程度の極微量成分の定量分析が可能となる。また、同一エネルギーを持つ、正および負のイオンを同一利得で計測できるので、正の二次イオン強度と負の二次イオン強度を定量的に比較することができる。

【発明の効果】

本発明によれば

(1) イオン-電子変換器で発生した二次電子を効率よく利用することができる。イオン検出器として高い利得を持つ。

(2) パルス計数方式と結合すると100%に近い

計数効率が得られる。

(3) 上記(2)の場合、特に低雑音の光電子増倍管を用いた場合でも、効率よく光を光電面に導くことができ、毎秒1個以下の雑音で信号を検出することができ、検出器の検出限界を大幅に向上させることができる。

(4) 同一エネルギーを持つ、正および負のイオンを同一利得で計測できる。

(5) 装置が簡単でコストが低減できる。

などの効果を生じる。

4. 図面の簡単な説明

第1図は本発明の一実施例の縦断面図である。

符号の説明

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|---------------|-------------|
| 1...イオン-電子変換器 | 3...アルミニウム膜 |
| 2...メッシュ状電極 | 5...光電子増倍管 |
| 4...シンチレータ | 7...二次電子 |
| 6...高圧電源 | 9...イオン |
| 8...質量分析器 | |

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